



# NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2-97, CHANGE 1

Subj: CH-1 TO NVIC 2-97, IMPLEMENTATION OF OPERATIONAL MEASURES FOR  
EXISTING TANK VESSELS WITHOUT DOUBLE HULLS UNTIL 2015

1. **PURPOSE.** This Circular revises Navigation and Vessel Inspection Circular (NVIC) No. 2-97 to amend the guidance provided for the minimum under-keel clearance requirements prescribed by 33 CFR 157.455. Specifically, this Circular revises paragraph 5.H. and Enclosure 4 of NVIC 2-97. These changes are needed to reflect the amended regulations published as a Final Rule in the Federal Register on September 23, 1997.
2. **BACKGROUND.** On July 30, 1996, the Coast Guard published a final rule requiring the owners, masters, or operators of tank vessels of 5,000 gross tons or more that do not have double hulls and that carry oil in bulk as cargo to comply with certain operational measures. This final rule included a provision requiring owner notification of the vessel's calculated anticipated under-keel clearance which was scheduled to go into effect on November 27, 1996. Following issuance of the final rule, the Coast Guard received comments expressing concern about the implementation of the owner notification portion of the anticipated under-keel clearance provision and requesting an additional opportunity to comment on the provision. On November 27, 1996, the Coast Guard granted this request by suspending the owner notification provision and giving the public 90 days to comment on the anticipated under-keel clearance requirement in general. The final rule, published on September 23, 1997, addresses the comments received and amends the original anticipated under-keel clearance regulations included in 33 CFR 157.455.
3. **DISCUSSION.** In general, the final rule amends the prescriptive requirements for calculating under-keel clearance and removes the owner notification provision, but continues to stress the importance of communication between the pilot and the master about the vessel's transit, including its anticipated under-keel clearance. The following summarizes the amendments to the under-keel clearance requirements:

- a. The requirement for a tankship owner or operator to provide either written under-keel clearance guidance or otherwise communicate directly with the master has been amended

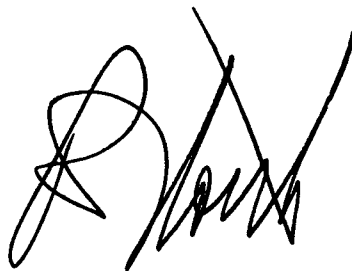
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to exclude the communication option. By only requiring written guidance, the tankship master no longer has to worry about difficulties contacting company personnel or having to leave the bridge in order to comply.

- b. The term "port-specific" has been removed from the original requirement for the owner or operator to provide written, port-specific, under-keel clearance guidance. This avoids confusion over the term "port specific" and enables the owner or operator to provide more generic under-keel clearance guidance.
  - c. The original final rule stated that an owner should not allow a vessel to proceed if transit "would not be prudent considering, but not limited to, the anticipated under-keel clearance, any Captain of the Port (COTP) under-keel clearance guidance, and the pilot's recommended clearance". To ensure the criteria is clearly defined, this sentence has been amended by removing the phrase "but not limited to".
  - d. The original final rule contained prescriptive criteria for calculating the anticipated under-keel clearance. To make this requirement less prescriptive, this paragraph has been amended by removing the calculation criteria entirely. However, the amended regulation requires that the tankship master and the pilot discuss the ship's planned transit including the anticipated under-keel clearance.
4. **IMPLEMENTATION.** Make the following changes to the subject NVIC:
- a. Remove original page 7 and 8 of NVIC 2-97, and insert page 7 and 8 of NVIC 2-97, CH-1.
  - b. Remove original Enclosure (4) to NVIC 2-97, and insert Enclosure (4) to NVIC 2-97, CH-1.
5. **ACTION.** This revised guidance shall take effect on January 21, 1998, the effective date of the final rule.



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Assistant Commandant  
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NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 2-97, CH-1

Encl: Page 7 and 8 of NVIC 2-97, CH-1  
Enclosure (4) to NVIC 2-97

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- (2) Guidance. The maneuvering poster and other maneuvering information required in IMO Resolution A.601(15) is more detailed than the information required by 33 CFR 164 or 46 CFR 35. Squat characteristics and additional engine information must be displayed along with the general turning circle information. The pilot card, required to be filled out by the vessel master, provides the pilot with quick reference to important propulsion, loading, and maneuvering information.

#### H. Minimum Under-Keel Clearance.

- (1) Background. Beginning January 21, 1998, tankship owners or operators must provide tankship masters with written under-keel clearance guidance. Prior to transiting port, the tankship master shall plan the ship's passage using the owner or operator's written guidance and estimate the anticipated under-keel clearance. The tankship master and the pilot shall discuss the transit plan including the anticipated under-keel clearance. Tankships or tank barges that are 5,000 GT or more and are fitted with double bottoms covering the entire cargo tank length are not required to comply with this regulation but are encouraged to do so.
- (2) Guidance.
  - ◇ The master is responsible for estimating the minimum under-keel clearance along the transit route of the vessel, including the facility or anchorage. To assist the master with this requirement, the vessel owner or operator must provide the master with written under-keel clearance guidance. Vessel draft, controlling depth of the port, and the impact of weather and other environmental conditions such as sea conditions and vessel traffic must be addressed in written guidance. If conditions which mandate when the owner or operator must be contacted are not prescribed in writing, the guidance should provide the master with direct authority to delay the transit or take any action necessary to ensure the vessel's safe navigation.
  - ◇ The effect of squat should be included as a factor to consider with calculating the ship's deepest navigational draft. Although prescriptive methods for calculating under-keel clearance are not provided in the final rule, consideration of squat and how it may affect the vessel's maneuverability during a transit is required by 33 CFR 164.11 for all vessels.
  - ◇ The amended regulation ensures that the master and the pilot discuss the passage plan, including the anticipated under-keel clearance. This discussion should include speed, squat, and maneuverability criteria (as found in the wheelhouse poster information required by 33 CFR 157.450) and their effect on the vessel's safe transit. An entry must be made in the tankship's official log or in other on board documentation reflecting the discussion between the master and pilot.
  - ◇ Although the phrase "but not limited to" has been removed from the final rule, company guidance should consider the types of contingencies intended by this phrase. These contingencies may include such things as: anticipated traffic; ship-specific maneuvering characteristics with respect to small under-keel clearance; or other existing company policies that may be affected.

- ◇ Local COTPs, who have knowledge of port-specific needs, may choose to implement speed restrictions or provide formulas for squat calculation. However, prior to implementation as a regulated navigation area, a rulemaking project must be initiated so that the public will have an opportunity to comment.

H. Emergency Steering Capability.

- (1) Background. Beginning November 27, 1997, tank barges of 5,000 GT or more without double hulls must be towed by towing vessels that have a steering gear system as described in 33 CFR 157.460.
- (2) Guidance.
  - ◇ This system is only meant to be required on the towing vessel that takes the barge through its port-to-port transit. Towing vessels such as fleeting tugs or assistant tugs that help maneuver a barge are not required to have this steering system duplication.
  - ◇ Towing vessels fitted with twin screws meet this requirement provided they have separate control systems for each propeller.

H. Fendering System.

- (1) Background. Beginning November 27, 1996, tank barges of 5,000 GT or more without double hulls must be towed and maneuvered with towing vessels that have fendering systems substantial enough to prevent metal to metal contact between the towing vessel and the barge.
- (2) Guidance. This system is required for any towing vessel that takes the barge through its port-to-port transit and those towing vessels, such as fleeting tugs or assistant tugs, that help maneuver a barge.

**GUIDELINES FOR DEVELOPMENT OF WRITTEN UNDER-KEEL  
CLEARANCE GUIDANCE FOR TANK VESSEL MASTERS**

1. The purpose of this requirement is to create an effective line of communication between the vessel owner or operator, the master, and the pilot in order to establish a safe under-keel clearance prior to the vessel entering port or getting underway. Tankship owners and operators must provide vessel masters with written under-keel clearance guidance. This requirement will prevent situations in which a vessel master (and pilot) may feel compelled to enter port with a less than desirable under-keel clearance because of scheduling pressure.
2. Written under-keel clearance guidance should reflect ship-specific considerations. The emphasis of this guidance should be to consider the vessel's maneuvering constraints and the anticipated under-keel clearance along the planned passage and at the facility.
3. Tank barge owners and operators must provide written guidance to towing vessel operators on acceptable under-keel clearance criteria.

The following examples should help illustrate the intent of this requirement:

EXAMPLE 1 - (TANKSHIP).

The master shall consider the ship's deepest navigational draft and the controlling depth of the port transit before arrival at the pilot station or, when outbound, prior to getting underway. The ship's draft shall be calculated using guidance contained in the loading manual and the trim and stability booklet. The forward and aft draft readings shall also be visually confirmed prior to transiting port unless deemed unsafe by the master. The vessel's draft must be recorded in the pilot card prior to entering or leaving port. The controlling depth of the port transit shall be estimated using charted information, tide calculations, and any pertinent information found in the Coast Pilot or Local Notice to Mariners. This information shall be used to estimate the minimum under-keel clearance.

The ship's draft, controlling depth of the port transit, and the anticipated under-keel clearance shall be discussed with the vessel's pilot. The pilot should be consulted for any additional information that may affect the controlling depth of the port transit. This discussion shall highlight important parts of the transit plan such as transit speed, squat effect, shoals, turn bearings, etc. The anticipated affect of weather and sea conditions must also be discussed with the pilot and considered in the transit plan. An entry must be made in the official log book reflecting this discussion.

The master shall take any appropriate action to ensure the vessel's safe transit. It is not necessary to notify (the vessel owner/operator) prior to taking such action unless significant delays or scheduling conflicts will result.

EXAMPLE 2 - (TANKSHIP).

**NOTE: This example contains some additional guidance beyond that required by regulation.**

The master shall use the guidance contained in the ship's loading manual to estimate the vessel's maximum navigational draft prior to transiting port. The vessel's draft shall be visually confirmed prior to the pilot boarding, unless weather endangers the crew. The squat data found in the vessel's maneuvering test information shall also be used to adjust the estimated draft based on the port's transit speed and depth under keel. The vessel's draft and other required vessel status information shall be recorded in the pilot card prior to transit.

The vessel's transit shall be laid out on appropriate charts and areas of restricted navigation or shallow areas shall be highlighted. The master shall review all turn bearings and critical transit points. Local Notice to Mariners, Coast Pilots, and regulated navigation areas as described in 33 CFR 165 shall be used to update the port chart. The master shall contact the facility to confirm the estimated dockside depth at the ship's arrival or departure time. With this information, the controlling depth of the port transit, including the facility, shall be estimated.

Using the estimated draft and controlling depth information, the master shall estimate the smallest under-keel clearance the vessel may encounter during the planned transit. The master shall use this information to identify maneuvering constraints, if any, that could develop.

The master shall discuss the entire planned passage with the pilot, specifically indicating how and what assumptions were used to develop the under-keel clearance estimate, and identifying potential maneuvering constraints. This discussion shall take as much time as the master deems necessary to fully understand the pilot's recommendations and concerns. The effects of recent or potential weather on the route, such as wind or reduced visibility, and environmental conditions, such as shoaling, swells, and unusual tides and currents, shall be discussed. Vessel traffic that may affect the ship's transit shall also be discussed. An entry must be made in the official log book reflecting this discussion.

The under-keel clearance estimated for all U.S. port transits shall be \_\_\_\_ meters unless a greater clearance is recommended by the pilot, Captain of the Port, or other port authority.

In the case where a greater clearance is recommended by the pilot, the master shall consider the basis for the recommendation when deciding whether to proceed with port transit. In any case, the master is authorized to take any reasonable action to ensure a safe port transit. Reasonable action may include delay of vessel transit, lightering, or employing a tug for assistance. If such action causes the vessel to be delayed by more than 2 hours, the Vessel Operations Department shall be notified.



EXAMPLE 3 - (TANK BARGE).

**Under-keel Clearance:**

The master must ensure that there is adequate underkeel clearance at all stages of the voyage and at all times while at anchorage or berth.

In assessing the adequacy of underkeel clearance, the following factors must be taken into account:

- the mean and deepest draft of the vessel
- the effect of trim and/or list
- the effect of squat at the anticipated maximum transit speeds at each stage of the voyage.
- charted depths
- the effect of tide and current
- the impact of weather on tidal effect
- effect of sea/swell conditions
- depth of water at berth or anchorage

Where a government, port authority, or pilot organization establishes a mandatory or recommended minimum under-keel clearance, the master must ensure that, as a minimum, such under-keel clearance is maintained after taking into account the factors listed above.

**Squat:**

Squat is the phenomenon whereby the ship's draft is increased in shallow water due to the hydrodynamic effects between the ship and the sea floor causing an increase in draft. It effectively reduces the under-keel clearance in areas where clearance may be critical. Squat is approximately proportional to the  $(\text{speed})^2$  of the ship, hence halving the speed reduces the squat effect by a factor of four. In general, squat effect starts to be felt in waters where the depth/draft ratio is less than four.

Masters must ensure that they take squat effect into account when calculating the vessel's deepest navigational draft and, in order to minimize its effect, they must not hesitate to reduce speed when operating in shoal water.

**Notification:**

The master is authorized to take any action necessary to ensure safe transit of the vessel. If such action results in delay of more than two hours, the master shall contact (vessel operator) to discuss intentions.



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